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A process to control line width after etching, comprising:
 providing a mask generation data file, including data on lines having a first minimum width;

modifying the data file whereby said first minimum width is increased by an amount; from said modified file, forming a reticle;

coating a semiconductor wafer, having a top layer, with photoresist and then exposing said photoresist to an image of said reticle and then developing the photoresist to form a photoresist image;

inspecting said photoresist image thereby determining a second minimum width;
based on the difference between the first and second minimum widths, generating
a control sequence for photoresist trimming;

then trimming the photoresist image according to said control sequence; and then etching said top layer, using the trimmed photoresist image as a mask.

- 2. The process of claim 1 wherein said first minimum width is between about 0.14 and 0.18 microns.
- 3. The process of claim 1 wherein said second minimum width is between about 0.12 and 0.16 microns.
- 4. The process of claim 1 wherein the amount by which the first minimum width is increased is between about 0.01 and 0.03 microns.



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- 5. The process of claim 1 wherein said trimming control sequence further comprises using a mixture of chlorine and oxygen gases, in a conductive or inductive etcher, at a power level between about 200 and 300 watts, for between about 20 and 60 seconds.
- 6. The process of claim 1 wherein the coating of photoresist has a thickness between about 0.3 and 0.5 microns.
- 7. A process to reduce edge roughness of lines in a photoresist pattern, comprising: providing a mask generation data file, including data on lines having a first minimum width;

modifying the data file whereby said first minimum width is increased by an amount; from said modified file, forming a reticle;

coating a semiconductor wafer, having a top layer, with photoresist and then exposing said photoresist to an image of said reticle and then developing the photoresist to form a photoresist image of the lines;

inspecting said photoresist image thereby determining a second minimum width; based on the difference between the first and second minimum widths, generating a control sequence for photoresist trimming; and

then trimming the photoresist image according to said control sequence, thereby reducing edge roughness of the lines.

8. The process of claim 7 wherein the lines in the photoresist image, prior to trimming,



have an edge roughness between about 15 and 25 nm.

- 9. The process of claim 7 wherein the lines in the photoresist image, after trimming, have an edge roughness between about 10 and 15 nm.
- 10. The process of claim 7 wherein said trimming control sequence further comprises using a mixture of chlorine and oxygen gases, in a conductive or inductive etcher, at a power level between about 200 and 300 watts, for between about 20 and 60 seconds.
- 11. A process for width control of a polysilicon gate, comprising:

 providing a mask generation data file, including data on lines having a first minimum width;

modifying the data file whereby said first minimum width is increased by an amount; from said modified file, forming a reticle; providing a semiconductor wafer having a top layer of polysilicon

depositing a layer of a hard mask material on said polysilicon layer;

coating the hard mask layer with photoresist and then exposing said photoresist to an image of said reticle and then developing the photoresist to form a photoresist image;

inspecting said photoresist image thereby determining a second minimum width;

based on the difference between the first and second minimum widths, generating

a control sequence for photoresist trimming;

then trimming the photoresist image according to said control sequence;

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then etching said hard mask layer, using the trimmed photoresist image as a mask, thereby forming a hard mask; and

then etching the polysilicon layer to form a gate.

- 12. The process of claim 11 wherein the amount by which the first minimum width is increased is between about 0.01 and 0.03 microns.
 - 13. The process of claim 11 wherein said trimming control sequence further comprises using a mixture of chlorine and oxygen gases, in a conductive or inductive etcher, at a power level between about 200 and 300 watts, for between about 20 and 60 seconds.
 - 14. The process of claim 11 wherein the polysilicon layer has a thickness between about 0.15 and 0.35 microns.
 - 15. The process of claim 11 wherein the hard mask layer is selected from the group consisting of silicon oxide, silicon nitride, and silicon oxynitride.
 - 16. The process of claim 11 wherein the hard mask layer has a thickness between about 0.04 and 0.08 microns.
- 15 17. A process to reduce edge roughness of a semiconductor gate line, having a first width, comprising:

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providing a mask generation data file, including data on said first the gate width; modifying the data file whereby said first line width is increased by an amount; from said modified file, forming a reticle;

providing a semiconductor wafer having a top layer of polysilicon

depositing a layer of a hard mask material on said polysilicon layer;

coating the hard mask layer with photoresist and then exposing said photoresist to an image of said reticle and then developing the photoresist to form a photoresist image;

inspecting said photoresist image thereby determining a second gate width;

based on the difference between the first and second gate widths, generating a control sequence for photoresist trimming;

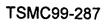
then trimming the photoresist image according to said control sequence;

then etching said hard mask layer, using the trimmed photoresist image as a mask, thereby forming a hard mask; and

then etching the polysilicon layer to form a gate having reduced edge roughness.

- 18. The process of claim 17 wherein the lines in the photoresist image, prior to trimming, have an edge roughness between about 15 and 25 nm.
- 19. The process of claim 17 wherein the lines in the photoresist image, after trimming, have an edge roughness between about 10 and 15 nm.
- 20. The process of claim 17 wherein said trimming control sequence further comprises





using a mixture of chlorine and oxygen gases, in a conductive or inductive etcher, at a power level between about 200 and 300 watts, for between about 20 and 60 seconds.